

Amendments to the 1994 Water Quality Control Plan for the
Sacramento River and San Joaquin River Basins

Subject	Date Adopted By Reg. Bd.	Regional Board Resolution No.	Date in Effect
1. Amendment Specifically Authorizing Compliance Schedules in NPDES Permits for Achieving Water Quality Objectives or Effluent Limits Based on Objectives	5/26/95	95-142	5/26/95*
2. Adoption of Water Quality Objectives and an Implementation Plan Regulation of Agricultural Subsurface Drainage in the Grassland Area	5/3/96	96-147	1/10/97*
3. Adoption of Site Specific Water Quality Objectives for pH and Turbidity for Deer Creek in El Dorado County	7/19/02	R5-2002-0127	10/21/03
4. Adoption of Corrective Language	9/6/02	R5-2002-0151	1/27/04
5. Adoption of a Control Program for Mercury in Clear Lake, including COMM use for Clear Lake and Mercury Objectives for Fish Tissue	12/6/02	R5-2002-0207	10/2/03
6. Adoption of a Control Program for Orchard Pesticide Runoff and Diazinon Runoff into the Sacramento and Feather Rivers, including Site-Specific Water Quality Objectives for Diazinon	10/16/03	R5-2003-0148	8/11/04

- * The amendment is not in effect until it is approved by the State Water Resources Control Board and Office of Administrative Law. If the amendment involves adopting or revising a standard which relates to surface waters it must also be approved by the U.S. Environmental Protection Agency (USEPA) [40 CFR Section 131(c)]. If the standard revision is disapproved by USEPA, the revised standard remains in effect until it is revised by the basin planning process, or USEPA promulgates its own rule which supersedes the standard revision [40 CFR Section 131.21(c)]

**THE WATER QUALITY CONTROL PLAN (BASIN PLAN)
FOR THE
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION**

FOURTH EDITION
Revised September 2004 (with Approved Amendments)

**THE SACRAMENTO RIVER BASIN AND
THE SAN JOAQUIN RIVER BASIN**



**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION**

**Robert Schneider, Chair
Karl Longley, Vice Chair
Alson Brizard, Member
Christopher Cabaldon, Member
Cher Kablanow, Member
Robert Fong, Member
Lucille Palmer-Byrd, Member**

Thomas R. Pinkos, Executive Officer

COVER PHOTO ACKNOWLEDGMENTS:

Rafting the American River: Rapid Shooters, Lotus CA
Yosemite: David Rosen/ Ducks Unlimited

Sunset Waterfowl: David Rosen/ Ducks Unlimited
Sugar Beets: Brenda Grewell/ Dept. of Water Resources

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MAPS

TABLE II-1

SURFACE WATER BODIES AND BENEFICIAL USES

	SURFACE WATER BODIES (1)	HYDRO UNIT NUMBER	MUN	AGRI-CULTURE		INDUSTRY			RECREATION			FRESHWATER HABITAT (2)		MIGRATION		SPAWNING		WILD	NAV	
				AGR		PROC	IND	POW	REC-1		REC-2	WARM	COLD	MIGR		SPWN				
				MUNICIPAL AND DOMESTIC SUPPLY	IRRIGATION	STOCK WATERING	PROCESS	SERVICE SUPPLY	POWER	CONTACT	CANOEING (1) AND RAFTING	OTHER NONCONTACT	WARM	COLD	WARM (3)	COLD (4)	WARM (3)			COLD (4)
1	McCLOUD RIVER	505.	E						E	E	P	E	E	E				E	E	
2	GOOSE LAKE	527.20	E	E	E				E	E	E	E	E	E				E	E	
3	PIT RIVER																			
3	NORTH FORK, SOUTH FORK, PIT RIVER	526.00	E	E	E					E	P	E	E	E			E	E	E	
4	CONFLUENCE OF FORKS TO HAT CREEK	526.35	E	E	E				E	E	E	E	E	E			E		E	
5	FALL RIVER	526.41	E	E	E				E	E	E	E	E	E					E	
6	HAT CREEK	526.30		E					E	E	E	E	E	E					E	
7	BAUM LAKE	526.34							E	E		E	E	E				P	E	
8	MOUTH OF HAT CREEK TO SHASTA LAKE	526.	E	E	E				E	E	E	E	P	E			E	E	E	
	SACRAMENTO RIVER																			
9	SOURCE TO BOX CANYON RESERVOIR	525.22		E	E					E		E	E	E					E	
10	LAKE SISKIYOU	525.22								E		E	E	E				P	E	
11	BOX CANYON DAM TO SHASTA LAKE	525.2		E	E					E	E	E	E	E				E	E	
12	SHASTA LAKE	506.10	E	E					E	E		E	E	E			E	E	E	
13	SHASTA DAM TO COLUSA BASIN DRAIN		E	E	E		E		E	E	E	E	E	E	E	E	E	E	E	E
14	WHISKEY TOWN RESERVOIR	524.61	E	E	E				E	E		E	E	E			E	E	E	E
15	CLEAR CREEK BELOW WHISKEYTOWN RESERVOIR	524.62	E	E	E					E	E	E	E	E			E	E	E	
16	COW CREEK	507.3	P	E	E				E	E	P	E	E	E			E	E	E	
17	BATTLE CREEK	507.12		E	E				E	E	E	E	E	E			E	E	E	
18	COTTONWOOD CREEK	524.3	E	E	E	P	P		P	E	E	E	E	E			E	E	E	
19	ANTELOPE CREEK	509.63	E	E	E					E		E	E	E			E	E	E	
20	MILL CREEK	509.42	E	E	E					E		E	E	E			E	E	E	
21	THOMES CREEK	523.10		E	E				P	E		E	E	E			E	E	E	
22	DEER CREEK	509.20	E	E	E					E	E	E	E	E			E	E	E	
23	BIG CHICO CREEK	509.14		E	E					E	E	E	E	E			E	E	E	
24	STONY CREEK	522.00		E	E					E	E	E	P			E	E	E	E	
25	EAST PARK RESERVOIR	522.33								E		E	E	P				E		
26	BLACK BUTTE RESERVOIR	522.12		E	E					E		E	E	E				E		
	BUTTE CREEK								E											
27	SOURCES TO CHICO	521.30	E	E	E				E	E			E	E			E	E	E	
28	BELOW CHICO, INCLUDING BUTTE SLOUGH	520.40		E	E					E	E		E			E	E	E	E	
29	COLUSA BASIN DRAIN	520.21		E	E					E	E		E	P	E		E	E	E	

LEGEND

E = EXISTING BENEFICIAL USES
P = POTENTIAL BENEFICIAL USES
L = EXISTING LIMITED BENEFICIAL USE

NOTE:

Surface waters with the beneficial uses of Groundwater Recharge (GWR), Freshwater Replenishment (FRSH), and Preservation of Rare and Endangered Species (RARE) have not been identified in this plan. Surface waters of the Sacramento and San Joaquin River Basins falling within these beneficial use categories will be identified in the future as part of the continuous planning process to be conducted by the State Water Resources Control Board.

TABLE II-1 (cont'd)

SURFACE WATER BODIES AND BENEFICIAL USES

	SURFACE WATER BODIES (1)	HYDRO UNIT NUMBER	MUN	AGRI-CULTURE		INDUSTRY			RECREATION			FRESHWATER HABITAT (2)		MIGRATION		SPAWNING		WILD	NAV
				AGR		PROC	IND	POW	REC-1		REC-2	WARM	COLD	MIGR		SPWN			
				IRRIGATION	STOCK WATERING	PROCESS	SERVICE SUPPLY	POWER	CONTACT	CANOEING (1) AND RAFTING	OTHER NONCONTACT	WARM	COLD	WARM (3)	COLD (4)	WARM (3)	COLD (4)		
30	COLUSA BASIN DRAIN TO EYE ["I"] STREET BRIDGE	520.00	MUNICIPAL AND DOMESTIC SUPPLY	E								E						E	
31	SUTTER BYPASS	520.3		E								E			E		E		
32	FEATHER RIVER LAKE ALMANOR	518.41		E				E				E					E		
33	NORTH FORK, FEATHER RIVER	518.4	E					E					E				E		
34	MIDDLE FORK, FEATHER RIVER	518.3															E		
35	SOURCE TO LITTLE LAST CHANCE CREEK	518.35		E	E					E		E					E		
36	FRENCHMAN RESERVOIR	518.36								E		E					E		
37	LITTLE LAST CHANCE CREEK TO LAKE OROVILLE	518.3	E							E		E					E		
38	LAKE DAVIS	518.34								E		E					E		
39	LAKES BASIN LAKES	518.5								E		E					E		
40	LAKE OROVILLE	518.12	E	E				E				E					E		
41	FISH BARRIER DAM TO SACRAMENTO RIVER	515.	E	E						E		E		E	E	E	E		
42	YUBA RIVER																		
43	SOURCES TO ENGLEBRIGHT RESERVOIR	517.	E	E	E			E		E		E		E			E		
44	ENGLEBRIGHT DAM TO FEATHER RIVER	515.3		E	E			E		E		E		E	E	E	E		
45	BEAR RIVER	515.1	E	E	E			E		E		E		E	P	P	P		
46	AMERICAN RIVER																		
47	NORTH FORK, SOURCE TO FOLSOM LAKE	514.5	E	E						E		E					E		
48	MIDDLE FORK, SOURCE TO FOLSOM LAKE	514.4	E	E	E			E		E		E					E		
49	DESOLATION VALLEY LAKES	514.4								E		E					E		
50	SOUTH FORK	514.3																	
51	SOURCE TO PLACERVILLE	514.3	E					E		E		E					E		
52	PLACERVILLE TO FOLSOM LAKE	514.32	E	E				E		E		E							
53	FOLSOM LAKE	514.23	E	E			P	E		E		E					E		
54	FOLSOM DAM TO SACRAMENTO RIVER	519.21	E	E			E	E		E		E		E	E	E	E		
55	YOLO BYPASS	510.		E	E					E		E		E	P	E	E		
56	CACHE CREEK	513.52	E	E	E					E		E					E		
57	CLEAR LAKE (a)	511/513	E	E	E	E	E			E		E					E		
58	CLEAR LAKE TO YOLO BYPASS																		

(1) Shown for streams and rivers only with the implication that certain flows are required for this beneficial use.

(2) Resident does not include anadromous. Any Segments with both COLD and WARM beneficial use designations will be considered COLD water bodies for the application of water quality objectives.

(3) Striped bass, sturgeon, and shad.

(4) Salmon and steelhead

(5) As a primary beneficial use.

(6) The indicated beneficial uses are to be protected for all waters except in specific cases where evidence indicates the appropriateness of additional or alternative beneficial use designations.

(7) Sport fishing is the only recreation activity permitted.

(8) Beneficial uses vary throughout the Delta and will be evaluated on a case-by-case basis.

(9) Per State Board Resolution No. 90-28, Marsh Creek and Marsh Creek Reservoir in Contra Costa County are assigned the following beneficial uses: REC1 and REC2

A/ Hidden Reservoir = Hensley Lake

B/ Buchanan Reservoir = Eastman Lake

(a) The following beneficial uses EXIST in addition to those noted in Table II-1

Mud Slough (north): COMM and SHELL
Salt Slough: COMM, BIOL, and SHELL
Wetland Water Supply Channels: BIOL
Clear Lake: COMM

TABLE II-1 (cont'd)

SURFACE WATER BODIES AND BENEFICIAL USES

	SURFACE WATER BODIES (1)	HYDRO UNIT NUMBER	MUN	AGRI-CULTURE		INDUSTRY			RECREATION			FRESHWATER HABITAT (2)		MIGRATION		SPAWNING		WILD	NAV
				AGR		PROC	IND	POW	REC-1		REC-2	WARM	COLD	MIGR		SPWN			
				IRRIGATION	STOCK WATERING						CANOEING (1) AND RAFTING	OTHER NONCONTACT							
55	PUTAH CREEK	512.21	E	E	E			P	E		E	E	E			E		E	
56	LAKE BERRYESSA	510/511	E	E	E				E	E	E	P				E		E	
	LAKE BERRYESSA TO YOLO BYPASS		E	E	E				E	E	E	E	E			E		E	
	OTHER LAKES AND RESERVOIRS IN SACRAMENTO R. BASIN 5A (6)		E	E	E	E		E	E		E	E	E			E		E	
57	COSUMNES RIVER	532.	E	E					E		E		E				E	E	
58	SOURCES TO NASHVILLE RESERVOIR (PROPOSED)	532.	P					P	P		P	P	P			P	P	P	
59	NASHVILLE RESERVOIR (PROPOSED)	531/532	E	E	E				E	E	E	E	E	E	E	E	E	E	
	SOURCE TO DELTA																		
60	MOKELUMNE RIVER	532.6	E					E	E	E	E	E	E	E		E	E	E	
61	SOURCES TO PARDEE RESERVOIR	532.6	E					E	E	E	E	E	E	E		E	E	E	
62	PARDEE RESERVOIR (7)	531.2	E	E	E				E	E	E	E	E	E		E	E	E	
	CAMANCHE RESERVOIR																		
63	CAMANCHE RESERVOIR TO DELTA	531.2		E	E				E	E	E	E	E	E	E	E	E	E	
	CALAVERAS RIVER																		
64	SOURCE TO NEW HOGAN RESERVOIR	533.							E	E	E	E	E	E	E	E	E	E	
65	NEW HOGAN RESERVOIR	533.1							E	E	E	E	E	E	E	E	E	E	
66	NEW HOGAN RESERVOIR TO DELTA	531.3	E	E	E	P	P		E	E	E	E	E	E	E	E	E	E	
	OTHER LAKES AND RESERVOIRS IN HYDRO UNIT NOS. 531, 532, 533, 543, 544 (6)		E	E	E	E		E	E		E	E	E	E	E		E	E	
	SAN JOAQUIN RIVER																		
67	SOURCES TO MILLERTON LAKE	540.	E	E	E			E	E	E	E	E	E					E	
68	MILLERTON LAKE	540.12	P	E	E				E		E	P						E	
69	FRIANT DAM TO MENDOTA POOL	545.	E	E	E	E			E	E	E	E	E	E	E	E	P	E	
70	MENDOTA DAM TO SACK DAM	545.1	P	E	E	E			E	E	E		E	E	E	E	P	E	
71	SACK DAM TO MOUTH OF MERCED RIVER	535.7	P	E	E	E			E	E	E		E	E	E	E	P	E	
72	FRESNO RIVER																		
	SOURCE TO HIDDEN RESERVOIR A/	539.31	E	E	E				E		E	E	E					E	
73	HIDDEN RESERVOIR A/	539.32	E		E				E		E	E	E					E	
74	HIDDEN RESERVOIR TO SAN JOAQUIN RIVER	545.	P	E	E				E	P	E	E	E					E	
75	CHOWCHILLA RIVER																		
	SOURCE TO BUCHANAN RESERVOIR B/	539.11							E		E	E	E					E	
76	BUCHANAN RESERVOIR B/	539.12	E	E	E				E		E	E	E					E	
77	BUCHANAN DAM TO SAN JOAQUIN RIVER	535/545	P	E		E			E	P	E	E	E					E	

(1) Shown for streams and rivers only with the implication that certain flows are required for this beneficial use.

(2) Resident does not include anadromous. Any Segments with both COLD and WARM beneficial use designations will be considered COLD water bodies for the application of water quality objectives.

(3) Striped bass, sturgeon, and shad.

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				AGR		PROC	IND	POW	REC-1		REC-2	WARM	COLD	MIGR		SPWN			
				IRRIGATION	STOCK WATERING	PROCESS	SERVICE SUPPLY	POWER	CONTACT	CANOEING (1) AND RAFTING	OTHER NONCONTACT	WARM	COLD	WARM (3)	COLD (4)	WARM (3)	COLD (4)		
78	MERCED RIVER																		
79	SOURCE TO McCLURE LAKE	537.	P	E				E	E	E	E	E	E				E		
80	McCLURE LAKE	537.22	P	E				E	E	E	E	E	E				E		
	McSWAIN RESERVOIR	537.1	P	E				E	E	E	E	E	E				E		
81	McSWAIN RESERVOIR TO SAN JOAQUIN RIVER	535.	E		E	E	E	E	E	E	E	E	E	E	E	E	E		
82	YOSEMITE LAKE	535.9							E	E	E	E	E				E		
83	MOUTH OF MERCED RIVER TO VERNALIS TUOLUMNE RIVER	535/541	P	E	E	E			E	E	E	E	E	E	E	E	E		
84	SOURCE TO [NEW] DON PEDRO RESERVOIR	536.	E	E	E			E	E	E	E	E	E				E		
85	NEW DON PEDRO RESERVOIR	536.32	P					E	E	E	E	E	E				E		
86	NEW DON PEDRO DAM TO SAN JOAQUIN RIVER	535.	P	E	E				E	E	E	E	E	E	E	E	E		
	STANISLAUS RIVER																		
87	SOURCE TO NEW MELONES RESERVOIR (PROPOSED)	534.	E	E	E			E	E	E	E	E	E				E		
88	NEW MELONES RESERVOIR	534.21	E	E	E			E	E	E	E	E	E				E		
89	TULLOCH RESERVOIR	534.22	P	E	E			E	E	E	E	E	E				E		
90	GOODWIN DAM TO SAN JOAQUIN RIVER	535.	P	E	E	E	E	E	E	E	E	E	E	E	E	E	E		
91	SAN LUIS RESERVOIR	542.32	E	E	E		E	E	E		E	E	E				E		
92	O'NEILL RESERVOIR	541.2	E	E	E			E	E	E	E	E	E						
93	OTHER LAKES AND RESERVOIRS IN SAN JOAQUIN R. BASIN, (EXCLUDING HYDRO UNIT NOS. 531-533, 543, 544) (6)		E					E	E		E	E	E			E	E		
94	CALIFORNIA AQUEDUCT	541.	E	E	E	E	E	E	E	E	E	E	E				E		
95	DELTA-MENDOTA CANAL	541/543	E	E	E				E		E	E	E				E		
	GRASSLAND WATERSHED [a]	541.2																	
96	MUD SLOUGH (NORTH)			L (b)	E				E		E	E	E			E	E		
97	SALT SLOUGH			E	E				E		E	E	E			E	E		
98	WETLAND WATER SUPPLY CHANNELS (10)			E	E												E		
C	SACRAMENTO SAN JOAQUIN DELTA (8, 9)	544.	E	L (b)	E	E	E		E		E	L (c)	E	E	E	E	E	E	E

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 (5) As a primary beneficial use.
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 (7) Sport fishing is the only recreation activity permitted.

(8) Beneficial uses vary throughout the Delta and will be evaluated on a case-by-case basis.
 (9) Per State Board Resolution No. 90-28, Marsh Creek and Marsh Creek Reservoir in Contra Costa County are assigned the following beneficial uses: REC1 and REC2
 (10) Wetland water supply channels for which beneficial uses are designated are defined in Appendix 40

(a) The following beneficial uses EXIST in addition to those noted in Table II-1
 Mud Slough (north): COMM and SHELL
 Salt Slough: COMM, BIOL, and SHELL
 Wetland Water Supply Channels: BIOL
 Clear Lake: COMM

(b) Elevated natural salt and boron concentrations may limit this use to irrigation of salt and boron tolerant crops. Intermittent low flow conditions may also limit this use.
 (c) Wetland channels can sustain aquatic life, but due to fluctuating flow regimes and habitat limitations, may not be suitable for nesting and/or propagation.

III. WATER QUALITY OBJECTIVES

The Porter-Cologne Water Quality Control Act defines water quality objectives as "...the limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area" [Water Code Section 13050(h)]. It also requires the Regional Water Board to establish water quality objectives, while acknowledging that it is possible for water quality to be changed to some degree without unreasonably affecting beneficial uses. In establishing water quality objectives, the Regional Water Board must consider, among other things, the following factors:

- Past, present, and probable future beneficial uses;
- Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto;
- Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area;
- Economic considerations;
- The need for developing housing within the region;
- The need to develop and use recycled water. (Water Code Section 13241)

The Federal Clean Water Act requires a state to submit for approval of the Administrator of the U.S. Environmental Protection Agency (*USEPA*) all new or revised water quality standards which are established for surface and ocean waters. As noted earlier, California water quality standards consist of both beneficial uses (identified in Chapter II) and the water quality objectives based on those uses.

There are **seven important points** that apply to water quality objectives.

The **first point** is that water quality objectives can be revised through the basin plan amendment process. Objectives may apply region-wide or be specific to individual water bodies or parts of water bodies. Site-specific objectives may be developed whenever

the Regional Water Board believes they are appropriate. As indicated previously, federal regulations call for each state to review its water quality standards at least every three years. These Triennial Reviews provide one opportunity to evaluate changing water quality objectives, because they begin with an identification of potential and actual water quality problems, i.e., beneficial use impairments. Since impairments may be associated with water quality objectives being exceeded, the Regional Water Board uses the results of the Triennial Review to implement actions to assess, remedy, monitor, or otherwise address the impairments, as appropriate, in order to achieve objectives and protect beneficial uses. If a problem is found to occur because, for example, a water quality objective is too weak to protect beneficial uses, the Basin Plan should be amended to make the objective more stringent. (Better enforcement of the water quality objectives or adoption of certain policies or redirection of staff and resources may also be proper responses to water quality problems. See the Implementation chapter for further discussion.)

Changes to the objectives can also occur because of new scientific information on the effects of specific constituents. A major source of information is the USEPA which develops data on the effects of chemical and other constituent concentrations on particular aquatic species and human health. Other information sources for data on protection of beneficial uses include the National Academy of Science which has published data on bioaccumulation and the Federal Food and Drug Administration which has issued criteria for unacceptable levels of chemicals in fish and shellfish used for human consumption. The Regional Water Board may make use of those and other state or federal agency information sources in assessing the need for new water quality objectives.

The **second point** is that achievement of the objectives depends on applying them to controllable water quality factors. *Controllable water quality factors* are those actions, conditions, or circumstances resulting from human activities that may influence the quality of the waters of the State, that are subject to the authority of the State Water Board or the Regional Water Board, and that may be reasonably controlled. Controllable factors are not allowed to cause further degradation of water quality in instances where uncontrollable factors have

Color

Water shall be free of discoloration that causes nuisance or adversely affects beneficial uses.

Dissolved Oxygen

Within the legal boundaries of the Delta, the dissolved oxygen concentration shall not be reduced below:

7.0 mg/l in the Sacramento River (below the I Street Bridge) and in all Delta waters west of the Antioch Bridge; 6.0 mg/l in the San Joaquin River (between Turner Cut and Stockton, 1 September through 30 November); and 5.0 mg/l in all other Delta waters except for those bodies of water which are constructed for special purposes and from which fish have been

excluded or where the fishery is not important as a beneficial use.

For surface water bodies outside the legal boundaries of the Delta, the monthly median of the mean daily dissolved oxygen (*DO*) concentration shall not fall below 85 percent of saturation in the main water mass, and the 95 percentile concentration shall not fall below 75 percent of saturation. The dissolved oxygen concentrations shall not be reduced below the following minimum levels at any time:

Waters designated WARM 5.0 mg/l
Waters designated COLD 7.0 mg/l
Waters designated SPWN 7.0 mg/l

The more stringent objectives in Table III-2 apply to specific water bodies in the Sacramento and San Joaquin River Basins:

TABLE III-2
SPECIFIC DISSOLVED OXYGEN WATER QUALITY OBJECTIVES

<u>AMOUNT</u>	<u>TIME</u>	<u>PLACE</u>
9.0 mg/l *	1 June to 31 August	Sacramento River from Keswick Dam to Hamilton City (13)
8.0 mg/l	1 September to 31 May	Feather River from Fish Barrier Dam at Oroville to Honcut Creek (40)
8.0 mg/l	all year	Merced River from Cressy to New Exchequer Dam (78)
8.0 mg/l	15 October to 15 June	Tuolumne River from Waterford to La Grange (86)

* When natural conditions lower dissolved oxygen below this level, the concentrations shall be maintained at or above 95 percent of saturation.

Floating Material

Water shall not contain floating material in amounts that cause nuisance or adversely affect beneficial uses.

Methylmercury

For Clear Lake (53), the methylmercury concentration in fish tissue shall not exceed 0.09 and 0.19 mg methylmercury/kg wet weight of tissue in trophic level 3 and 4 fish, respectively. Compliance with these objectives shall be determined by analysis of fish

tissue as described in Chapter V, Surveillance and Monitoring.

Oil and Grease

Waters shall not contain oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.

pH

The pH shall not be depressed below 6.5 nor raised above 8.5. Changes in normal ambient pH levels shall not exceed 0.5 in fresh waters with designated COLD or WARM beneficial uses. In determining compliance with the water quality objective for pH, appropriate averaging periods may be applied provided that beneficial uses will be fully protected.

The following site-specific objectives replace the general pH objective, above, in its entirety for the listed water bodies.

For Goose Lake (2), pH shall be less than 9.5 and greater than 7.5 at all times. For Deer Creek, source to Cosumnes River, pH shall not be depressed below 6.5 nor raised above 8.5.

Pesticides

- No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses.
- Discharges shall not result in pesticide concentrations in bottom sediments or aquatic life that adversely affect beneficial uses.
- Total identifiable persistent chlorinated hydrocarbon pesticides shall not be present in the water column at concentrations detectable within the accuracy of analytical methods approved by the Environmental Protection Agency or the Executive Officer.

- Pesticide concentrations shall not exceed those allowable by applicable antidegradation policies (see State Water Resources Control Board Resolution No. 68-16 and 40 C.F.R. Section 131.12.).
- Pesticide concentrations shall not exceed the lowest levels technically and economically achievable.
- Waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of pesticides in excess of the Maximum Contaminant Levels set forth in California Code of Regulations, Title 22, Division 4, Chapter 15.
- Waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of thiobencarb in excess of 1.0 µg/l.

Pesticide concentrations shall not exceed the levels identified in Table III-2A. Where more than one objective may be applicable, the most stringent objective applies.

For the purposes of this objective, the term pesticide shall include: (1) any substance, or mixture of substances which is intended to be used for defoliating plants, regulating plant growth, or for preventing, destroying, repelling, or mitigating any pest, which may infest or be detrimental to vegetation, man, animals, or households, or be present in any agricultural or nonagricultural environment whatsoever, or (2) any spray adjuvant,

TABLE III-2A

SPECIFIC PESTICIDE OBJECTIVES

<u>PESTICIDE</u>	<u>MAXIMUM CONCENTRATION AND AVERAGING PERIOD</u>	<u>APPLICABLE WATER BODIES</u>
Diazinon	0.080 µg/L ; 1-hour average 0.050 µg/L ; 4-day average Not to be exceeded more than once every three years on average.	Sacramento River from Shasta Dam to Colusa Basin Drain (13) and the Sacramento River from the Colusa Basin Drain to I Street Bridge (30). Feather River from Fish Barrier Dam to Sacramento River (40).

or (3) any breakdown products of these materials that threaten beneficial uses. Note that discharges of "inert" ingredients included in pesticide formulations must comply with all applicable water quality objectives.

Radioactivity

Radionuclides shall not be present in concentrations that are harmful to human, plant, animal or aquatic life nor that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal or aquatic life.

At a minimum, waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of radionuclides in excess of the maximum contaminant levels (MCLs) specified in Table 4 (MCL Radioactivity) of Section 64443 of Title 22 of the California Code of Regulations, which are incorporated by reference into this plan. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect.

Salinity

Electrical Conductivity and Total Dissolved Solids-- Special Cases in the Sacramento and San Joaquin River Basins Other Than the Delta

The objectives for electrical conductivity and total dissolved solids in Table III-3 apply to the water bodies specified. To the extent of any conflict with the general Chemical Constituents water quality objectives, the more stringent shall apply.

Electrical Conductivity, Total Dissolved Solids, and Chloride--Delta Waters

The objectives for salinity (electrical conductivity, total dissolved solids, and chloride) which apply to the Delta are listed in Table III-5 at the chapter's end. See Figure III-2 for an explanation of the hydrologic year type classification system. The objectives in Table III-5 were adopted by the State Water Board in May 1991 in the Water Quality Control Plan for Salinity.

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organizations to evaluate compliance with this objective.

The survival of aquatic life in surface waters subjected to a waste discharge or other controllable water quality factors shall not be less than that for the same water body in areas unaffected by the waste discharge, or, when necessary, for other control water that is consistent with the requirements for "experimental water" as described in *Standard Methods for the Examination of Water and Wastewater*, latest edition. As a minimum, compliance with this objective as stated in the previous sentence shall be evaluated with a 96-hour bioassay.

In addition, effluent limits based upon acute biotoxicity tests of effluents will be prescribed where appropriate; additional numerical receiving water quality objectives for specific toxicants will be established as sufficient data become available; and source control of toxic substances will be encouraged.

Turbidity

Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in turbidity attributable to controllable water quality factors shall not exceed the following limits:

- Where natural turbidity is between 0 and 5 Nephelometric Turbidity Units (NTUs), increases shall not exceed 1 NTU.
- Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent.
- Where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs.
- Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.

In determining compliance with the above limits, appropriate averaging periods may be applied provided that beneficial uses will be fully protected.

Exceptions to the above limits will be considered when a dredging operation can cause an increase in turbidity. In those cases, an allowable zone of dilution within which turbidity in excess of the limits may be tolerated will be defined for the operation and prescribed in a discharge permit.

For Folsom Lake (50) and American River (Folsom Dam to Sacramento River) (51), except for periods of storm runoff, the turbidity shall be less than or equal 10 NTUs. To the extent of any conflict with the general turbidity objective, the more stringent applies.

For Delta waters, the general objectives for turbidity apply subject to the following: except for periods of storm runoff, the turbidity of Delta waters shall not exceed 50 NTUs in the waters of the Central Delta and 150 NTUs in other Delta waters. Exceptions to the Delta specific objectives will be considered when a dredging operation can cause an increase in turbidity. In this case, an allowable zone of dilution within which turbidity in excess of limits can be tolerated will be defined for the operation and prescribed in a discharge permit.

For Deer Creek, source to Cosumnes River:

- When the dilution ratio for discharges is less than 20:1 and where natural turbidity is less than 1 Nephelometric Turbidity Unit (NTU), discharges shall not cause the receiving water daily average turbidity to exceed 2 NTUs or daily maximum turbidity to exceed 5 NTUs. Where natural turbidity is between 1 and 5 NTUs, discharges shall not cause receiving water daily average turbidity to increase more than 1 NTU or daily maximum turbidity to exceed 5 NTUs
- Where discharge dilution ratio is 20:1 or greater, or where natural turbidity is greater than 5 NTUs, the general turbidity objectives shall apply.

WATER QUALITY OBJECTIVES FOR GROUND WATERS

The following objectives apply to all ground waters of the Sacramento and San Joaquin River Basins, as the objectives are relevant to the protection of designated beneficial uses. These objectives do not require improvement over naturally occurring background concentrations. The ground water objectives contained in this plan are not required by the federal Clean Water Act.

Bacteria

In ground waters used for domestic or municipal supply (MUN) the most probable number of coliform organisms over any seven-day period shall be less than 2.2/100 ml.

Chemical Constituents

Ground waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses.

At a minimum, ground waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs) specified in the following provisions of Title 22 of the California Code of Regulations, which are incorporated by reference into this plan: Tables 64431-A (Inorganic Chemicals) and 64431-B (Fluoride) of Section 64431, Table 64444-A (Organic Chemicals) of Section 64444, and Tables 64449-A (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits) and 64449-B (Secondary Maximum Contaminant Levels-Ranges) of Section 64449. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect. At a minimum, water designated for use as domestic or municipal supply (MUN) shall not contain lead in excess of 0.015 mg/l. To protect all beneficial uses, the Regional Water Board may apply limits more stringent than MCLs.

Radioactivity

At a minimum, ground waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of radionuclides in excess of the maximum contaminant levels (MCLs) specified in Table 4 (MCL Radioactivity) of Section 64443 of Title 22 of the California Code of Regulations, which are incorporated by reference into this plan. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect.

Tastes and Odors

Ground waters shall not contain taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses.

Toxicity

Ground waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life associated with designated beneficial use(s). This objective applies regardless of whether the toxicity is caused by a single substance or the interactive effect of multiple substances.

compounds have been discharged directly to unlined sumps, pits, or depressions and spread on soils. In some cases, these disposal practices went on many years before they were discovered or discontinued. Leaking municipal or industrial sewer lines also contribute to ground water pollution.

The promulgation of EPA sludge regulations under section 503 of the Clean Water Act and the adoption of water quality objectives for toxic pollutants pursuant to section 303(c)(2)(B) will require that NPDES permits, upon renewal, be updated to reflect these new regulations. Once effluent limitations sufficient to comply with sludge requirements and water quality objectives for toxic pollutants have been placed into NPDES permits, POTWs subject to pretreatment program requirements will be required to update their local limits consistent with EPA pretreatment program regulations and guidance.

Storm Water

Runoff from residential and industrial areas also contributes to water quality degradation. Urban storm water runoff contains pesticides, oil, grease, heavy metals, polynuclear aromatic hydrocarbons, other organics, and nutrients. Because these pollutants accumulate during the dry summer months, the first major autumn storm can flush a highly concentrated load to receiving waters and catch basins. Combined storm and sanitary systems may result in some runoff to sewage treatment plants. In other cases, storm water collection wells can produce direct discharges to ground water. Impacts of storm water contaminants on surface and ground waters are an important concern.

The "Control Action Considerations of the State Water Board" section in Chapter IV provides more detail on how the Regional Water Board regulates storm water.

Mineral Exploration and Extraction

Mineral exploration and extraction discharges are associated with several ore, geothermal, and petroleum/natural gas activities. The discharge of greatest concern in the Sacramento and San Joaquin River Basins is the result of ore exploration and extraction.

Drainage and runoff from mines and various operations associated with mining can result in serious impacts to ground and surface water beneficial uses, if not properly managed. Along

much of the east side of the Coast Range, runoff, drainage, and erosion from old mercury mines is a problem that has resulted in high levels of mercury in aquatic environments and fish tissue. There are also major metal and acid discharges associated with abandoned copper mines in the Sierra/ Cascades drainages. Sedimentation can be a problem in the construction and operation of many mines.

Within the past decade there has been a significant increase in the amount of gold extraction and processing in the Sierra foothills and in the Coast Ranges. Most of these operations have been made possible by advances in technology, permitting the economical extraction of minute quantities of gold from large volumes of ore with the use of cyanide and other reagents by heap and vat leach methods, and by the current high price of gold on world markets. Advances in ore and waste rock handling techniques have made open pit mining more profitable and common. These mining operations involve the handling and management of large quantities of ore, potentially-toxic chemical reagents, tailings, waste rock, and spent leaching solutions in piles, tailings ponds, and impoundments. If not carefully managed, these operations have the potential to leach toxic reagents, heavy metals, salts, and acidic drainage waters into surface and ground water resources. Mining waste management facilities and associated mining operations are regulated through the issuance of waste discharger requirements under the State and Regional Water Boards' hazardous and solid waste regulatory program (Title 23, California Code of Regulations (CCR), Division 3, Chapter 15 and Title 27, CCR, Division 2, Subdivision 1).

Efforts to control drainage have gradually expanded over the years. Staff assessments of mine water quality problems done in 1979 and 1992 helped direct the Regional Water Board's approach to the problems. When other options were exhausted, the Regional Water Board has used public funds to abate pollution from these mines.

Geothermal operations in the basins are centered in the Geysers Area of Lake County. Potential impacts to water quality are caused by soil erosion from road construction and site preparation, high pressure steam blowouts, and accidental spills of materials from drilling operations, power plants, steam condensate lines, and waste transport accidents. Bentonite clay, boron, ammonia, sodium hydroxide, sulfur compounds, heavy metals, and petroleum products are found in various concentrations in mud sumps, steam condensate lines, and sulfide abatement sludge.

Operational failures can release these substances into waterways.

Hazardous and Non-Hazardous Waste Disposal

Discharges of solid, semi-solid, and liquid wastes to landfills, waste piles, surface impoundments, pits, trenches, tailings ponds, natural depressions and land treatment facilities (collectively called "waste management units") have the potential to create sources of pollution affecting the quality of waters of the State. Unlike surface waters which often have the capacity to assimilate discharged waste constituents, ground waters have little or no assimilative capacity, due to their slow migration rate, lack of aeration, lower biological activity, and laminar flow patterns. If the concentrations of constituents in the land-discharged waste are sufficiently high to prevent the waste from being classified as "inert waste" under 27 CCR, Section 20230, discharges of such wastes to waste management units require long term containment or active treatment following the discharge in order to prevent waste or waste constituents from migrating to and impairing the beneficial uses of waters of the State. Pollutants from such discharges may continue to affect water quality long after the discharge of new waste to the unit has ceased, either because of continued leachate or gas discharges from the unit, or because pollutants have accumulated in underlying soils from which they are gradually released to ground water.

Landfills for disposal of municipal or industrial solid waste (solid waste disposal sites) are the major categories of waste management units in the region, but there are also surface impoundments used for storage or evaporative treatment of liquid wastes, waste piles for the storage of solid wastes, and land treatment units for the biological treatment of semi-solid sludges from wastewater treatment facilities and liquid wastes from cannery and other industrial operations. Sumps, trenches, and soil depressions have been used in the past for liquid waste disposal. Mining waste management units (tailings ponds, surface impoundments, and waste piles) also represent a significant portion of the waste management units in the Region. The Regional Water Board issues waste discharge requirements to ensure that these discharges are properly contained to protect the Region's water resources from degradation, and to ensure that dischargers undertake effective monitoring to verify continued compliance with requirements.

These discharges, and the waste management units at which the wastes are discharged, are subject to concurrent regulation by other State and local agencies responsible for land use planning, solid waste management, and hazardous waste management. "Local Enforcement Agencies" (mainly cities and counties) implement the State's solid waste management laws and local ordinances governing the siting, design, and operation of solid waste disposal facilities (usually landfills) with the concurrence of the California Integrated Waste Management Board (CIWMB). The CIWMB also has direct responsibility for review and approval of plans for closure and post-closure maintenance of solid waste landfills. The Department of Toxic Substance Control (DTSC) issues permits for all hazardous waste treatment, storage, and disposal facilities (which include hazardous waste incinerators, tanks, and warehouses where hazardous wastes are stored in drums as well as landfills, waste piles, surface impoundments, and land treatment units). The State Water Board, Regional Water Boards, CIWMB, and DTSC have entered into a Memoranda of Understanding to coordinate their respective roles in the concurrent regulation of these discharges. In addition, the Toxic Pits Cleanup Act of 1984 precludes the storage or disposal of liquid hazardous wastes or hazardous wastes containing free liquids. The Regional Water Board is responsible for enforcing this Act under the authority of the Health and Safety Code, Section 25208 et seq. (See page IV-13 for further description).

The statutes and regulations governing the discharges of both hazardous and non-hazardous wastes have been revised and strengthened in the last few years. The discharge of municipal solid wastes to land are closely regulated and monitored; however, some water quality problems have been detected and are being addressed. Recent monitoring efforts under the State and Regional Water Boards' Title 23, CCR Division 3, Chapter 15; Title 27 CCR, Division 2, Subdivision 1; and SWAT programs have revealed that discharges of municipal solid wastes to unlined and single clay lined landfills have resulted in ground water degradation and pollution by volatile organic constituents (VOCs) and other waste constituents. VOCs are components of many household hazardous wastes and certain industrial wastes that are present within municipal solid waste streams. VOCs can easily migrate from landfills either in leachate or by vapor-phase transport. Clay liners and natural clay formations between discharged wastes and ground waters are largely ineffective in preventing water quality impacts from municipal solid waste constituents. In a recently adopted policy for water

quality control, the State Water Board found that "[r]esearch on liner systems for landfills indicates that (a) single clay liners will only delay, rather than preclude, the onset of leachate leakage, and (b) the use of composite liners represents the most effective approach for reliably containing leachate and landfill gas" (State Water Board Resolution No. 93-62, *Policy for Regulation of Discharges of Municipal Solid Waste*).

As a result of similar information on a national scale, the U. S. Environmental Protection Agency (USEPA) has adopted new regulations under Subtitle D of the Resource Conservation and Recovery Act (RCRA) which require the containment of municipal solid wastes by composite liners and leachate collection systems. Composite liners consist of a flexible synthetic membrane component placed above and in intimate contact with a compacted low-permeability soil component. This liner system enhances the effectiveness of the leachate collection and removal system and provides a barrier to vapor-phase transport of VOCs from the unit. Regional Water Boards and the CIWMB are implementing these new regulations in California under a policy for water quality control from the State Water Board (Resolution No. 93-62, discussed above) and new regulations from CIWMB. While a single composite liner of the type that can be approved under Subtitle D regulations is a significant improvement over past municipal solid waste containment systems, it should be noted, however, that single composite liners will not necessarily provide complete protection for ground water resources.

Contaminated Sites Threatening Ground Water Quality

The Regional Water Board has identified over 7000 sites with confirmed releases of constituents of concern which have adversely impacted or threaten to impact the quality of ground water resources. Sources of pollution at these sites include: leaking underground storage tanks and sumps; leaking above ground tanks; leaking pipelines; leaking waste management units, such as landfills, disposal pits, trenches and ponds; surface spills from chemical handling, transfer or storage; poor housekeeping; and illegal disposal. A policy for investigation and cleanup of such sites is contained in the section of this chapter titled "Policy for Investigation and Cleanup of Contaminated Sites."

Other Discharge Activities

Some remaining discharges of major concern include sedimentation from land development activities in the foothills and mountains, leachate from septic tank/individual wastewater disposal systems, and dredging and dredging spoils runoff.

Many of the foothill/mountain counties in the sub-basins face high growth rates. Sedimentation from the land disturbances associated with residential and commercial development is an increasing problem that, when added to the sedimentation resulting from farming and silvicultural operation, may require establishment of a region-wide erosion control program. The Regional Water Board's current practice is to emphasize local government control of erosion caused by residential development. Erosion control guidelines are included in the erosion/sedimentation action plan which is in the Appendix.

Improperly located, designed, constructed and/or maintained on-site wastewater treatment and disposal systems can result in ground and surface water degradation and public health hazards. The Regional Water Board's approach is that the control of individual wastewater treatment and disposal systems is best accomplished by local environmental health departments enforcing county ordinances designed to provide protection to ground and surface waters. To help the counties with enforcement, the Regional Water Board adopted guidelines which contain criteria for proper installation of conventional systems (see Guidelines section of this chapter and Appendix). Although the Regional Water Board has also prohibited septic tank usage in certain areas, it has formal and informal agreements with counties to evaluate field performance of alternative and special design systems.

The energy crisis of the 1970s resulted in a surge of small hydroelectric facility development in the mountains and foothills. Impairments to beneficial uses may occur because of erosion from construction and changes in water temperature. The Regional Water Board has published guidelines for small hydro-electric facilities (see Guidelines section of this chapter and Appendix) to help address some of the problems associated with small hydroelectric plants.

Dredging is a problem because the process can result in turbidity and the reintroduction and resuspension of harmful metal or organic materials. This latter effect occurs directly as a result of the displacement

of sediment at the dredging site and indirectly as a result of erosion of dredge spoil to surface waters at the deposition site. Another major concern is water quality problems associated with the dredge spoils disposal site. There is much dredging of the Sacramento and San Joaquin Rivers and the Delta because of the need to maintain the ship channels to the Ports of Sacramento and Stockton. The Regional Water Board regulates dredging operations on a case-by-case basis. Operational criteria may result from permits or the water quality certification requirements stemming from Section 401(a) of the Clean Water Act.

In addition to the problems described above, the Regional Water Board responds to spontaneous discharges such as spills, leaks and overflows. These can have cumulatively or individually significant effects on beneficial uses of ground and surface waters.

Water Bodies with Special Water Quality Problems

Water quality management may require the identification and ranking of water bodies with regard to certain quality parameters. Water Quality Limited Segments (WQLSs) are one example of expressing water quality problems by water bodies. WQLSs are those sections of lakes, streams, rivers or other fresh water bodies where water quality does not meet (or is not expected to meet) water quality standards even after the application of appropriate effluent limitations for point sources (40 CFR 130, et seq.).

Additional treatment beyond minimum federal requirements will be imposed on dischargers to WQLSs. Dischargers will be assigned or allocated a maximum allowable load of critical pollutants so that water quality objectives can be met in the segment.

The Regional Water Board's list of WQLSs is updated biennially as required by Clean Water Act Section 303(d). The current list may be obtained by contacting the Regional Water Board office.

THE NATURE OF CONTROL ACTIONS IMPLEMENTED BY THE REGIONAL WATER BOARD

The nature of actions to achieve water quality objectives consists of Regional Water Board efforts:

1. to identify potential water quality problems;
2. to confirm and characterize water quality problems through assessments for source, frequency, duration, extent, fate, and severity;
3. to remedy water quality problems through imposing or enforcing appropriate measures; and
4. to monitor problem areas to assess effectiveness of the remedial measures.

Generally, the actions associated with the first step consist of surveys or reviews of survey information and other data sources to isolate possible impairments of beneficial uses or water quality.

The characterization step usually involves studies that attempt to answer questions about a water quality problem's source, extent, duration, frequency, and severity. Information on these parameters is essential to confirm a problem and prepare for remedy. The Regional Water Board may gain this information through its own work or through data submittals requested of actual or potential dischargers under Section 13267 of the California Water Code.

Problem remedy calls for the Regional Water Board to prevent or clean up problems. A common means of prevention is through the issuance of National Pollutant Discharge Elimination System (NPDES) permits, waste discharge requirements (WDRs), discharge prohibitions, and other discharge restrictions. Cleanup is implemented through enforcement measures such as Cease and Desist (C&D) and Cleanup and Abatement (C&A) orders. The NPDES is a requirement of the Federal Clean Water Act (Section 402) and California has implementing responsibility. The national permit system only applies to certain surface water discharges. WDRs, which encompass permits, are called for by State law, Water Code Section 13260, et seq. The WDRs system is not as restricted as the Federal NPDES. As practical, WDRs may be used to control any type of discharge to ground or surface waters. C&D and C&A orders are two of the enforcement tools available to the Regional Water Board to correct actual or potential violations of WDRs, NPDES permits, prohibitions, and other water quality control obligations.

The details of the monitoring step are explained in Chapter V. In general, the Regional Water Board has wide latitude to require actual and potential dischargers to submit monitoring and surveillance

information, in addition to using State Water Board data or collecting its own.

Whatever actions the Regional Water Board implements must be consistent with the Basin Plan's beneficial uses and water quality objectives, as well as certain State and Regional Water Boards' policies, plans, agreements, prohibitions, guidance, and other restrictions or requirements. These considerations are described below and included in the Appendix when noted.

Control Action Considerations of the State Water Board

Policies and Plans

There are ten State Water Board water quality control policies and three State Water Board water quality control plans to which Regional Water Board actions must conform. Sections 13146 and 13247 of the California Water Code generally require that, in carrying out activities which affect water quality, all state agencies, departments, boards and offices must comply with all policies for water quality control and with applicable water quality control plans approved or adopted by the State Water Board. Two of the plans, the Ocean Plan and the Tahoe Plan, do not affect the Sacramento and San Joaquin River Basins. The policies and plans that are applicable are described below.

1. *The State Policy for Water Quality Control*

This policy declares the State Water Board's intent to protect water quality through the implementation of water resources management programs and serves as the general basis for subsequent water quality control policies. The policy was adopted by the State Water Board in 1972. See Appendix Item 1.

2. *State Water Board Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality of Water in California*

The State Water Board adopted this policy on 28 October 1968. The policy generally restricts the Regional Water Board and dischargers from reducing the water quality of surface or ground waters even though such a reduction in water quality might still allow the protection of the beneficial uses associated with the water prior to the quality reduction. The goal of the policy is to maintain high quality waters.

Changes in water quality are allowed only if the change is consistent with maximum benefit to the people of the State; does not unreasonably affect present and anticipated beneficial uses; and, does not result in water quality less than that prescribed in water quality control plans or policies.

USEPA water quality standards regulations require each state to adopt an "antidegradation" policy and specify the minimum requirements for the policy (40 CFR 131.12). The State Water Board has interpreted State Water Board Resolution No. 68-16 to incorporate the federal antidegradation policy. The Regional Water Board implements Resolution No. 68-16 consistent with the federal antidegradation policy where the federal regulations apply. Resolution No. 68-16 applies to both ground and surface waters of the state. Resolution No. 68-16 is Appendix Item 2; the federal policy is Appendix Item 39.

3. *State Water Board Resolution No. 74-43, The Water Quality Control Policy for the Enclosed Bays and Estuaries of California*

This policy was adopted by the State Water Board on 16 May 1974 and provides water quality principles and guidelines for the prevention of water quality degradation in enclosed bays and estuaries to protect the beneficial uses of such waters. The Regional Water Board must enforce the policy and take actions consistent with its provisions. (This policy does not apply to wastes from boats or land runoff except as specifically indicated for siltation and combined sewer flows.) See Appendix Item 3.

4. *State Water Board Resolution No. 75-58, Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Powerplant Cooling*

This policy was adopted by the State Water Board in June 1975. Its purpose is to provide consistent principles and guidance for supplementary waste discharge requirements or other water quality control actions for thermal powerplants using inland waters for cooling. The Regional Water Board is responsible for its enforcement. See Appendix Item 4.

11. *State Water Board Resolution No. 93-62, Policy for Regulation of Discharges of Municipal Solid Waste*

The policy for water quality control, adopted by State Water Board on 17 June 1993, directs Regional Water Boards to amend waste discharge requirements for municipal solid waste landfills to incorporate pertinent provisions of the federal "Subtitle D" regulations under the Resource Conservation and Recovery Act (40 CFR Parts 257 & 258). The majority of the provisions of the Subtitle D regulations become effective on 9 October 1993. Landfills which are subject to the Subtitle D regulations and the Policy are those which have accepted municipal solid waste on or after 9 October 1991. See Appendix Item 10.

12. *The Thermal Plan*

The Water Quality Control Plan for the Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California was adopted by the State Water Board on 18 May 1972 and amended 18 September 1975. The plan specifies water quality objectives, effluent quality limits, and discharge prohibitions related to thermal characteristics of interstate waters and waste discharges. See Appendix Item 11. (Note: the State Water Board adopted Resolution No. 92-82 on 22 October 1992, approving an exception to the Thermal Plan for Sacramento Regional County Sanitation District. See Appendix Item 12.)

13. *The Delta Plan, Water Right Decision 1485, and the Water Quality Control Plan for Salinity*

In August 1978, the State Water Board adopted the Delta Plan and Water Right Decision 1485 (D-1485). The Delta Plan contained water quality standards, Delta outflow requirements and export constraints for the Delta. These standards, requirements, and constraints were then implemented in D-1485 by making them conditions of the water right permits for the Central Valley Project and the State Water Project.

When the Delta Plan and accompanying D-1485 were originally issued, the State Water Board committed itself to review the Delta Plan in about ten years. In 1986, the State Court of Appeal issued a decision addressing legal challenges to the Delta Plan and D-1485. The

Court directed the State Water Board to take a global view toward its dual responsibilities (water quality and water rights) to the State's water resources.

In response to the Court's decision, the State Water Board adopted the Water Quality Control Plan for Salinity in May 1991. The Delta salinity, temperature, and dissolved oxygen standards contained in the plan are identified in Table III-5 of Chapter III.

14. *Nonpoint Source Management Plan*

In 1988, the State Water Board adopted (Resolution 88-123) a Nonpoint Source Management Plan. The Plan describes three general management approaches that are to be used to address nonpoint source problems. These are 1) voluntary implementation of best management practices, 2) regulatory based encouragement of best management practices and 3) adopted effluent limits.

The approaches are listed in order of increasing stringency. In general the least stringent option that successfully protects or restores water quality should be employed, with more stringent measures considered if timely improvements in beneficial use protection are not achieved. The Regional Water Board will determine which approach or combination of approaches is most appropriate for any given nonpoint source problem.

15. *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California" (a.k.a. State Implementation Plan or SIP)*

In March 2000, the State Water Board adopted the SIP in Resolution No. 2000-015. This Policy establishes:

- (1) Implementation provisions for priority pollutant criteria promulgated by the U.S. Environmental Protection Agency (U.S. EPA) through the National Toxics Rule (40 CFR 131.36) (promulgated on 22 December 1992 and amended on 4 May 1995) and through the California Toxics Rule (40 CFR 131.38) (promulgated on 18 May 2000 and amended on 13 February 2001), and for priority pollutant objectives established by Regional Water Boards in their basin plans; and

- (2) Monitoring requirements for 2,3,7,8-TCDD equivalents; and
- (3) Chronic toxicity control provisions.

In addition, this Policy includes special provisions for certain types of discharges and factors that could affect the application of other provisions in this Policy.

Programs

1. *Discharges of Hazardous Waste to Land, California Code of Regulations Title 23, Division 3, Chapter 15 and Consolidated Regulations for Treatment, Storage, Processing or Disposal of Solid Waste, California Code of Regulations Title 27, Division 2, Subdivision*

Title 23, CCR, Division 3 Chapter 15 and Title 27 CCR, Division 2, Subdivision 1 includes regulations governing discharges of hazardous and solid waste to land for treatment, storage, or disposal. The regulations cover landfills, surface impoundments, waste piles, land treatment units, mining waste management units and confined animal facilities. In addition, actions to clean up and abate conditions of pollution or nuisance at contaminated sites are covered by relevant portions of the regulations where contaminated materials are taken off-site for treatment, storage, or disposal and, as feasible, where wastes are contained or remain on-site at the completion of cleanup actions. The regulations classify wastes according to their threat to water quality, classify waste management units according to the degree of

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3. *Controllable Factors Policy*

Controllable water quality factors are not allowed to cause further degradation of water quality in instances where other factors have already resulted in water quality objectives being exceeded. Controllable water quality factors are those actions, conditions, or circumstances resulting from human activities that may influence the quality of the waters of the State, that are subject to the authority of the State Water Board or Regional Water Board, and that may be reasonably controlled.

4. *The Water Quality Limited Segment Policy*

Additional treatment beyond minimum federal requirements will be imposed on dischargers to Water Quality Limited Segments. Dischargers will be assigned or allocated a maximum allowable load of critical pollutants so that water quality objectives can be met in the segment.

To determine an allowable load for dischargers, the "Loading Capacity" must be determined. The "Loading Capacity" is the maximum amount of pollution that can be present in a water body without violating water quality objectives. The Loading Capacity can be established to address multiple pollutants or a single pollutant. The Loading Capacity can be allocated to NPDES permitted sources (point sources) as waste load allocations and to non-NPDES permitted sources (nonpoint sources) and background as load allocations. Part of the Loading Capacity may also be set aside or not assigned to account for any uncertainty in the Loading Capacity calculation.

The Loading Capacity and allocations are established to meet Clean Water Act Section 303(d) requirements. In addition, the Loading Capacity and allocations can provide a framework for actions to be taken by the Regional Water Board for achieving pollutant reductions and attaining water quality objectives.

5. *Regional Water Board Resolution No. 70-118, Delegation of Duties and Powers to the Regional Water Board's Executive Officer*

In January 1970, the Regional Water Board adopted Resolution No. 70-118 which delegates certain duties and powers of the Board to its Executive Officer pursuant to Section 13223 of

the California Water Code. See Appendix Item 25.

6. *Regional Water Board Resolution No. 96-147, San Joaquin River Agricultural Subsurface Drainage Policy*

- a. The control of toxic trace elements in agriculture subsurface drainage, especially selenium, is the first priority.
- b. The control of agricultural subsurface drainage will be pursued on a regional basis.
- c. The reuse of agricultural subsurface drainage will be encouraged, and actions that would limit or prohibit reuse discouraged.
- d. Of the two major options for disposal of salts produced by agricultural irrigation, export out of the basin has less potential for environmental impacts and, therefore, is the favored option. The San Joaquin River may continue to be used to remove salts from the basin so long as water quality objectives are met.
- e. The valley-wide drain to carry the salts generated by agricultural irrigation out of the valley remains the best technical solution to the water quality problems of the San Joaquin River and Tulare Lake Basin. The Regional Water Board, at this time, feels that a valley-wide drain will be the only feasible, long-range solution for achieving a salt balance in the Central Valley. The Regional Water Board favors the construction of a valley-wide drain under the following conditions:
 - All toxicants would be reduced to a level which would not harm beneficial uses of receiving waters.
 - The discharge would be governed by specific discharge and receiving water limits in an NPDES permit.
 - Long-term, continuous biological monitoring would be required.
- f. Optimizing protection of beneficial uses on a watershed basis will guide the development of actions to regulate agricultural subsurface drainage discharges.

- g. For regulation of selenium discharges, actions need to be focused on selenium load reductions.

7. *Antidegradation Implementation Policy*

The antidegradation directives of Section 13000 of the Water Code and State Water Board Resolution No. 68-16 ("Statement of Policy With Respect to Maintaining High Quality Waters in California") require that high quality waters of the State shall be maintained "consistent with the maximum benefit to the people of the State."

The Regional Water Board applies these directives when issuing a permit, or in an equivalent process, regarding any discharge of waste which may affect the quality of surface or ground waters in the region.

Implementation of this policy to prevent or minimize surface and ground water degradation is a high priority for the Board. In nearly all cases, preventing pollution before it happens is much more cost-effective than cleaning up

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toxicity. Pollutants which are carcinogens or which manifest their toxic effects on the same organ systems or through similar mechanisms will generally be considered to have potentially additive toxicity. The following formula will be used to assist the Regional Water Board in making determinations:

$$\sum_{i=1}^n \frac{[\text{Concentration of Toxic Substance}]_i}{[\text{Toxicologic Limit for Substance in Water}]_i} < 1.0$$

The concentration of each toxic substance is divided by its toxicologic limit. The resulting ratios are added for substances having similar toxicologic effects and, separately, for carcinogens. If such a sum of ratios is less than one, an additive toxicity problem is assumed not to exist. If the summation is equal to or greater than one, the combination of chemicals is assumed to present an unacceptable level of toxicologic risk. For example, monitoring shows that ground water beneath a site has been degraded by three volatile organic chemicals, A, B, and C, in concentrations of 0.3, 0.4, and 0.04 µg/l, respectively. Toxicologic limits for these chemicals are 0.7, 3, and 0.06 µg/l, respectively. Individually, no chemical exceeds its toxicologic limit. However, an additive toxicity calculation shows:

$$\frac{0.3}{0.7} + \frac{0.4}{3} + \frac{0.04}{0.06} = 1.2$$

The sum of the ratios is greater than unity (>1.0); therefore, the additive toxicity criterion has been violated. The concentrations of chemicals A, B, and C together present a potentially unacceptable level of toxicity.

For permitting purposes, it is important to clearly define how compliance with the narrative toxicity objectives will be measured. Staff is currently working with the State Water Board to develop guidance on this issue.

9. *Policy for Investigation and Cleanup of Contaminated Sites*

The Regional Water Board's strategy for managing contaminated sites is guided by several important principles, which are based on Water Code Sections 13000 and 13304, the Title 23, CCR, Division 3, Chapter 15 and Title 27, CCR, Division 2, Subdivision 1 regulations and

State Water Board Resolution Nos. 68-16 and 92-49:

a. State Water Board Policy & Regulation

The Regional Water Board will require conformance with the provisions of State Water Board Resolution No. 68-16 in all cases and will require conformance with applicable or relevant provisions of 23 CCR, Division 3, Chapter 15 and 27 CCR, Division 2, Subdivision 1 to the extent feasible. These provisions direct the Regional Water Board to ensure that dischargers are required to clean up and abate the effect of discharges in a manner that promotes attainment of background water quality, or the highest water quality which is reasonable and protective of beneficial uses if background levels of water quality cannot be restored.

b. Site Investigation

An investigation of soil and ground water to determine full horizontal and vertical extent of pollution is necessary to ensure that cleanup plans are protective of water quality. The goal of the investigation shall be to determine where concentrations of constituents of concern exceed beneficial use protective levels (water quality objectives) and, additionally, where constituents of concern exceed background levels (the zero-impact line). Investigations shall extend off-site as necessary to determine the full extent of the impact.

c. Source Removal/Containment

Immediate removal or containment of the source, to the extent practicable, should be implemented where necessary to prevent further spread of pollution as well as being among the most cost-effective remediation actions. The effectiveness of ground water cleanup techniques often depends largely on the completeness of source removal or containment efforts (e.g., removal of significantly contaminated soil or pockets of dense non-aqueous phase liquids).

d. Cleanup Level Approval

Ground water and soil cleanup levels are approved by the Regional Water Board. The Executive Officer may approve cleanup levels as appropriately delegated by the Board.

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constituents of concern will not threaten to cause ground water to exceed applicable ground water cleanup levels, and that remaining constituents do not pose significant risks to health or the environment. The Regional Water Board will consider water quality, health, and environmental risk assessment methods, as long as such methods are based on site-specific field data, are technically sound, and promote attainment of all of the above principles.

k. Verification of Soil Cleanup

Verification of soil cleanup generally requires verification sampling and follow-up ground water monitoring. The degree of required monitoring will reflect the amount of uncertainty associated with the soil cleanup level selection process. Follow-up ground water monitoring may be limited where residual concentrations of leachable/mobile constituents in soils are not expected to impact ground water quality.

l. Remaining Constituents

Where leachable/mobile concentrations of constituents of concern remain on-site in concentrations which threaten water quality, the Regional Water Board will require implementation of applicable provisions of Title 23, CCR, Division 3 Chapter 15 and Title 27, CCR, Division 2, Subdivision 1. Relevant provisions of Title 23, CCR, Division 3 Chapter 15 and Title 27, CCR, Division 2, Subdivision 1 which may not be directly applicable, but which address situations similar to those addressed at the cleanup site will be implemented to the extent feasible, in conformance with Title 23, CCR, Section 2511(d)/27 CCR, Section 20090(d). This may include, but is not limited to, surface or subsurface barriers or other containment systems, waste immobilization, toxicity reduction, and financial assurances.

10. *Policy for Obtaining Salt Balance in the San Joaquin Valley*

It is the policy of the Regional Water Board to encourage construction of facilities to convey agricultural drain water from the San Joaquin and Tulare Basins. A valley-wide conveyance

facility for agricultural drain waters impaired by high levels of salt is the only feasible, long-range solution for achieving a salt balance in the Central Valley.

11. *Watershed Policy*

The Regional Water Board supports implementing a watershed based approach to addressing water quality problems. The State and Regional Water Boards are in the process of developing a proposal for integrating a watershed approach into the Board's programs. The benefits to implementing a watershed based program would include gaining participation of stakeholders and focusing efforts on the most important problems and those sources contributing most significantly to those problems.

Regional Water Board Memoranda of Understanding (MOU) and Memoranda of Agreement (MOA)

1. *U.S. Bureau of Land Management*

In September 1985, the Regional Water Board Executive Officer signed MOUs with the three U.S. Bureau of Land Management Districts in the Central Valley (i.e., the Ukiah District, the Susanville District, and the Bakersfield District). The MOUs, which are identical for each District, aim at improving coordination between the two agencies for the control of water quality problems resulting from mineral extraction activities on BLM administered lands. See Appendix Items 26 through 28.

2. *U. S. Bureau of Reclamation Agreement*

On 2 July 1969, the Regional Water Board signed an MOA with the Bureau of Reclamation to schedule water releases from the New Melones Unit of the Central Valley Project to maintain an oxygen level at or above 5 mg/l in the Stanislaus River downstream of the unit and to not exceed a mean monthly TDS concentration of 500 mg/l in the San Joaquin River immediately below the mouth of the Stanislaus River. The MOA's water quality requirements are subject to some conditions. See Appendix Item 29.

3. *California Department of Fish and Game and
Mosquito Abatement and Vector Control
Districts of the South San Joaquin Valley*

On 25 February 1993, the Regional Water Board
Executive Officer signed an MOU with the California
Department of Fish and Game and 11 mosquito
abatement and vector control districts of the south

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- b. The discharge of agricultural subsurface drainage water to Salt Slough and wetland water supply channels identified in Appendix 40 is prohibited after 10 January 1997, unless water quality objectives for selenium are being met. This prohibition may be reconsidered if public or private interests prevent the implementation of a separate conveyance facility for agricultural subsurface drainage.
- c. The discharge of agricultural subsurface drainage water to Mud Slough (north) and the San Joaquin River from Sack Dam to the mouth of the Merced River is prohibited after 1 October 2010, unless water quality objectives for selenium are being met. This prohibition may be reconsidered if public or private interests prevent the implementation of a separate conveyance facility for agricultural subsurface drainage to the San Joaquin River.
- d. The discharge of selenium from agricultural subsurface drainage systems in the Grassland watershed to the San Joaquin River is prohibited in amounts exceeding 8,000 lbs/year for all water year types beginning 10 January 1997.
- e. Activities that increase the discharge of poor quality agricultural subsurface drainage are prohibited.

7. *Diazinon Discharges into the Sacramento and Feather Rivers*

Beginning July 1, 2008, (i) the direct or indirect discharge of diazinon into the Sacramento and Feather Rivers is prohibited if, in the previous year (July-June), any exceedance of the diazinon water quality objectives occurred, and (ii) the direct or indirect discharge of diazinon into any sub-watershed (identified in Table IV-5) is prohibited if, in the previous year (July-June), the load allocation was not met in that sub-watershed. Prohibition (i) applies only to diazinon discharges that are tributary to or upstream from the location where the water quality objective was exceeded.

These prohibitions do not apply if the discharge of diazinon is subject to a waiver of waste discharge requirements implementing the water quality objectives and load allocations for diazinon for the Sacramento and Feather Rivers, or governed by individual or general waste discharge requirements.

Regional Water Board Guidelines

The Regional Water Board has adopted guidance for certain types of dischargers which is designed to reduce the possibility that water quality will be impaired. The Regional Water Board may still impose discharge requirements. All of the Guidelines are contained in the Appendix (Items 33 through 37). Currently, the following Guidelines apply to the Sacramento and San Joaquin River Basins:

1. *Wineries*

This Guideline contains criteria for protecting beneficial uses and preventing nuisance from the disposal to land of stillage wastes.

2. *Erosion and Sedimentation*

This Guideline identifies practices to be implemented by local government to reduce erosion and sedimentation from construction activities.

3. *Small Hydroelectric Facilities*

This Guideline specifies measures to protect water quality from temperature, turbidity, and dissolved oxygen effects from the construction and operation of small hydroelectric Facilities.

4. *Disposal from Land Developments*

This Guideline contains criteria for the siting of septic tanks, sewer lines, leach fields, and seepage pits to protect water quality.

5. *Mining*

This Guideline identifies actions that the Regional Water Board takes to address the water quality problems associated with mining. It requires owners and operators of active mines to prepare plans for closure and reclamation, but it does not specify any practices or criteria for mine operators.

Nonpoint Source Action Plans

Section 208 of the 1972 Amendments to the Federal Clean Water Act resulted in monies being made available to states to address nonpoint source problems. The Regional Water Board used 208 grant funds to develop its mining and erosion/sedimentation guidelines, among other things. It also encouraged local governments to make use of the 208 program. As a result, several counties

in the sub-basins developed action plans to control nonpoint source problems which affected them. The Regional Water Board action plans are described in Table IV-2

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effects of total metals loadings and dissolved metals concentrations.

The Regional Water Board plans to develop a mass emission strategy to control the loads of metals entering receiving waters and the Delta. Although the strategy will focus on control of discharges from inactive and abandoned mines, reasonable steps will also be taken to limit loads of metals from other significant sources. The Regional Water Board also plans to continue to monitor for metals in the Delta and principal tributaries to the Delta to assess compliance with water quality objectives, to assess impacts on beneficial uses, and to coordinate monitoring and metal reduction programs with the San Francisco Regional Water Quality Control Board.

Where circumstances warrant, the Regional Water Board will support action to clean up and abate pollution from identified sources. Funds from the State Water Pollution Cleanup and Abatement Account have been and are being used to clean up and abate discharges from selected abandoned or inactive mines. Abatement projects are underway at Iron Mountain Mine, Walker Mine, Mammoth Mine, Balaklala Mine, Keystone Mine, Stowell Mine, and Penn Mine, as data show that these mines are the most significant sources in terms of total metals discharged to receiving waters.

However, recent judicial decisions have imposed liability on the Regional Water Board for its cleanup actions at the Penn Mine. As long as the risk of such liability exists, the Regional Water Board will likely choose not to perform cleanup at any additional sites. Action by the State Legislature or the Congress will probably be required to resolve concerns of liability and facilitate the State's role in site remediation.

The Regional Water Board also will seek additional resources to update the Regional Abandoned Mines Inventory, to establish a monitoring program to track metals across the Delta and into the Bay, and to determine what loads the Delta can assimilate without resulting in adverse impacts. Although most of the significant mine portal discharges are in the process of being controlled, others need studies to determine their potential for cleanup. Since a major uncharacterized source of metals are the tailings piles associated with the mines, studies are needed to define the loads from these sources in order to establish priorities for abatement activities.

Mercury Discharges in the Sacramento River and San Joaquin River Basins

Mercury problems are evident region-wide. The main concern with mercury is that, like selenium, it bioaccumulates in aquatic systems to levels that are harmful to fish and their predators. Health advisories have been issued which recommend limiting consumption of fish taken from the Bay/Delta, Clear Lake, Lake Berryessa, Black Butte Reservoir, Lake Pillsbury, and Marsh Creek Reservoir. Concentrations of mercury in other water bodies approach or exceed National Academy of Science (NAS), U.S. Environmental Protection Agency (EPA), and/or U.S. Food and Drug Administration (FDA) guidelines for wildlife and human protection. In addition to these concerns, fish-eating birds taken from some bodies of water in the Basins have levels of mercury that can be expected to cause toxic effects. Bird-kills from mercury also have been documented in Lake Berryessa. (There is also concern for birds in the Delta, but no studies have been completed.) The Regional Water Board has done a preliminary assessment of the mercury situation in the Central Valley Region and concluded that the problem is serious and remedies will be complex and expensive.

The short-term strategy is to concentrate on correcting problems at upstream sites while monitoring the Delta to see whether upstream control activities measurably benefit the Delta. The Regional Water Board will support efforts to fund the detailed studies necessary to define assimilative capacity and to fully define uptake mechanisms in the biota.

In the next few years monitoring is scheduled to be done in the Delta and at upstream sources. The Regional Water Board will continue to support efforts to study how mercury is cycled through the Delta and to further characterize upstream sources.

Clear Lake Mercury

The Regional Water Board has a goal to reduce methylmercury concentrations in Clear Lake fish by reducing total mercury loads from various sources within the Clear Lake watershed.

Sources of mercury include past and present discharges from the Sulphur Bank Mercury Mine (SBMM) site, small mercury mines and geothermal sources, natural and anthropogenic erosion of soils with naturally occurring mercury, and atmospheric deposition. The goal of the Clear Lake mercury management strategy is to reduce fish tissue methylmercury concentrations by 60% of existing

levels. This will be accomplished by reducing the concentration of total mercury in the surficial layer of lakebed sediment by 70% of existing levels and by further investigation and reduction of other mercury sources believed to have a high potential for mercury methylation. Through a complex process, total mercury is methylated and becomes bioavailable to organisms in the food web. The linkage between (1) the total mercury in the sediments derived from various sources and other sources of total mercury and (2) the concentration of methylmercury in ecological receptors, is complicated and subject to uncertainty. As additional information about these relationships becomes available, the Regional Water Board will revise and refine as appropriate the load allocation and implementation strategy to achieve fish tissue objectives.

Mercury Load Allocations

The strategy for meeting the fish tissue objectives is to reduce the inputs of mercury to the lake from tributaries and the SBMM site, combined with active and passive remediation of contaminated lake sediments. The load allocations for Clear Lake will result in a reduction in the overall mercury sediment concentration by 70% of existing concentrations. The load allocations are assigned to the active sediment layer of the lakebed, the SBMM terrestrial site, the tributary creeks and surface water runoff to Clear Lake, and atmospheric deposition. Table IV-5 summarizes the load allocations. The load allocation to the active sediment layer is expressed as reducing concentrations of total mercury in the active sediment layer to 30% of current concentrations. The load allocation to the SBMM terrestrial site is 5% of the ongoing loads from the terrestrial mine site. The load allocation for the mine also includes reducing mercury concentrations in surficial sediment to achieve the sediment compliance goals for Oaks Arm shown in Table IV-6. The load allocation to tributary and surface water runoff is 80% of existing loads. These load allocations account for seasonal variation in mercury loads, which vary with water flow and rainfall. The analysis includes an implicit margin of safety in the reference doses for methylmercury that were used to develop the fish tissue objectives. It also includes an explicit margin of safety of 10% to account for uncertainty in the relationship between fish tissue concentrations and loads of total mercury. The reductions in loads of total mercury from all sources are expected to result in attainment of water quality objectives.

**TABLE IV-5
MERCURY LOAD ALLOCATIONS**

Mercury Source	Allocation
Clear Lake Sediment	30% of existing concentration
Sulphur Bank Mine	5% of existing load
Tributaries	80% of existing load
Atmosphere	No change

Sulphur Bank Mercury Mine

Reducing mercury concentrations in surficial sediment by 70% is an overall goal for the entire lake. To achieve water quality objectives, extremely high levels of mercury in the eastern end of Oaks Arm near SBMM must be reduced by more than 70%. To evaluate progress in lowering sediment concentrations, the following sediment compliance goals are established at sites that have been sampled previously.

Current and past releases from the Sulphur Bank Mercury Mine are a significant source of total mercury loading to Clear Lake. Ongoing annual loads from the terrestrial mine site to the lakebed sediments occur through groundwater, surface water, and atmospheric routes. Loads from ongoing releases from the terrestrial mine site should be reduced to 5% of existing inputs. Because of its high potential for methylation relative to mercury in lakebed sediments, mercury entering the lake through groundwater from the mine site should be reduced to 0.5 kg/year.

Past releases from the mine site are a current source of exposure through remobilization of mercury that exists in the lakebed sediments as a result of past releases to the lake from the terrestrial mine site. Past active mining operations, erosion and other mercury transport processes at SBMM have contaminated sediment in Oaks Arm. The load allocation assigned to SBMM includes reducing surficial sediment concentrations in Oaks Arm by 70% (more at sites nearest the mine site) to meet the sediment compliance goals in Table IV-6.

In 1990, the U.S. Environmental Protection Agency (USEPA) placed Sulphur Bank Mercury Mine on the National Priorities List under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The USEPA has already performed remediation actions to stabilize waste rock piles, reduce erosion, and control surface water on the site.

**TABLE IV-6
SEDIMENT COMPLIANCE GOALS FOR
MERCURY IN CLEAR LAKE**

Site Designation	Location	Sediment Mercury Goal (a) (mg/kg dry weight)
Upper Arm UA-03	Center of Upper Arm on transect from Lakeport to Lucerne	0.8
Lower Arm LA-03	Center of Lower Arm, North and west of Monitor Point	1
Oaks Arm OA-01 (c)	0.3 km from SBMM	16 (b)
OA-02 (c)	0.8 km from SBMM	16 (b)
OA-03 (c)	1.8 km from SBMM	16
OA-04 (c)	3 km from SBMM	10
Narrows O1	7.7 km from SBMM	3

- (a) Sediment goals are 30% of existing concentrations. Existing concentrations are taken as the average mercury concentrations in samples collected in 1996-2000 (Clear Lake Basin Plan Amendment Staff Report).
- (b) Due to the exceptionally high concentrations existing at the eastern end of Oaks Arm, sediment goals at OA-01 and OA-02 are not 70% of existing concentrations. These goals are equal to the sediment goal established for OA-03.
- (c) Sediment goal is part of the load allocation for SBMM.

Estimates of the current annual loads from the terrestrial mine site to the surficial lakebed sediment are under investigation. Existing data indicate that loads of total mercury from the terrestrial mine site are within a broad range of 1 to 568 kg mercury per year. New data may be used to refine the load estimates as discussed below. As part of verifying compliance with the load allocations, remediation activities to address current and past releases from SBMM should be conducted to meet the sediment compliance goals listed in Table IV-6 for sediments within one kilometer of the mine site, specifically at sites OA-01 and OA-02.

The Regional Water Board anticipates that fish tissue objectives for mercury will not be met unless the load reductions from Sulphur Bank Mercury Mine are attained.

The Regional Water Board will request that USEPA continue remediation activities on the mine site and prepare an implementation plan or plans that address the following: reduction of ongoing releases of mercury from the SBMM site through surface water, groundwater, and the atmosphere; necessary remediation for mercury in lakebed sediments previously deposited through mining, erosion, and other processes at the mine site; and monitoring and review activities. The implementation plans should provide interim sediment goals and explain how control actions will assist in achieving fish tissue objectives for mercury in Clear Lake. The Regional Water Board will request that USEPA submit remediation plans for Regional Board approval for the SBMM site within eight years after the effective date of this amendment and implement the plan two years thereafter. USEPA should complete remediation activities at the mine site and active lakebed sediment remediation within ten years of plan implementation.

USEPA anticipates implementing additional actions to address the ongoing surface and groundwater releases from the SBMM over the next several years. These actions are expected to lead to significant reductions in the ongoing releases from the mine pit, the mine waste piles and other ongoing sources of mercury releases from the terrestrial mine site. USEPA also currently plans to investigate what steps are appropriate under CERCLA to address the existing contamination in the lakebed sediments due to past releases from the SBMM. Regional Water Board staff will continue to work closely with the USEPA on these important activities. In addition, Regional Water Board staff will coordinate monitoring activities to investigate other sources of mercury loads to Clear Lake. These investigations by USEPA and the Regional Water Board should reduce the uncertainty that currently exists regarding the annual load of total mercury to the lake, the contribution of each source to that load, and the degree to which those sources lead to methylmercury exposure to and mercury uptake by fish in the lake. This information should lead to more refined decisions about what additional steps are appropriate and feasible to achieve the applicable water quality criteria.

The sediment compliance goals for Oaks Arm will require USEPA to address both (1) the ongoing releases from the terrestrial mine site and (2) the load of total mercury that currently exists in the active lakebed sediment layer as a result of past releases. Potential options to control the ongoing releases of mercury from the terrestrial mine site include: remediation of onsite waste rock, tailings and ore piles to minimize the erosion of mercury contaminated sediments into the lake; diversion of surface water run-on away from waste piles and the inactive mine

pit; control and containment or treatment of surface water runoff; control of groundwater flow into Clear Lake; and reduction of mercury flux from the mine waste piles into the atmosphere.

Meeting the load allocation for the lakebed sediment will require remediation of contaminated sediment. Potential options to address the mercury that currently exists in the lakebed as a result of past releases and is being remobilized may include dredging the contaminated sediment, capping with clean sediments, facilitating natural burial of highly contaminated sediments, or reducing the transport of highly contaminated sediments from the Oaks Arm into the rest of the lake. Monitoring to assess progress toward meeting the load reduction goals from Sulphur Bank Mercury Mine should be planned and conducted as part of specific remediation activities. Baselines for mercury loads from the various ongoing inputs from the mine site should be established in order to evaluate successes of the remediation activities.

In order to refine the load estimates from SBMM, the Regional Water Board recommends that USEPA determine the following information: mercury concentrations and sediment deposition rates for sediment cores collected near the mine site; characterization of porewater in sediments near the mine site to determine sources, magnitude and impacts of mercury-containing fluids/groundwater entering the lake; estimates of total surface water and groundwater fluxes of mercury from SBMM, including transport through the wetlands north of the site; and patterns of sediment transport and deposition within the lake.

If additional information reveals that reaching the 95% reduction in mercury loads from the terrestrial mine site is technically infeasible or cost prohibitive, or otherwise not technically justified, the Regional Water Board will consider internal adjustments to the SBMM load allocation. It may be possible to adjust the allocation among the terrestrial site and the contaminated sediments associated with the SBMM, provided the internal reallocation achieves the same overall reduction in loads from mine-related sources (terrestrial mine site and ongoing contributions from highly contaminated sediments). Any internal adjustment must achieve the sediment compliance goals in the east end of Oaks Arm.

Although USEPA is currently spending public funds to address the releases from the SBMM, the owner of SBMM is the party that is legally responsible for addressing the past, current and future releases from the SBMM and for developing implementation plans, implementing control activities that result in achievement of the load reduction, and performing monitoring to verify the load reduction.

Tributaries and Surface Water Runoff

Past and current loads of total mercury from the tributaries and direct surface water runoff are also a source of mercury loading to the lake and to the active sediment layer in the lakebed. This section excludes loads from surface water runoff associated with the SBMM because those are addressed separately above. The loads of total mercury from the tributaries and surface water runoff to Clear Lake should be reduced by 20% of existing levels. In an average water year, existing loads are estimated to be 18 kg/year. Loads range from 1 to 60 kg/year, depending upon water flow rates and other factors. The load allocation applies to tributary inputs as a whole, instead of to individual tributaries. Efforts should be focused on identifying and controlling inputs from hot spots. The U.S. Bureau of Land Management, U.S. Forest Service, other land management agencies in the Clear Lake Basin, and Lake County shall submit plans for monitoring and implementation to achieve the necessary load reductions. The Regional Water Board will coordinate with the above named agencies and other interested parties to develop the monitoring and implementation plans. The purpose of the monitoring shall be to refine load estimates and identify potential hot spots of mercury loading from tributaries or direct surface runoff into Clear Lake. Hot spots may include erosion of soils with concentrations of mercury above the average for the rest of the tributary. If significant sources are identified, the Regional Water Board will coordinate with the agencies to develop and implement load reductions. The implementation plans shall include a summation of existing erosion control efforts and a discussion of feasibility and proposed actions to control loads from identified hot spots. The agencies will provide monitoring and implementation plans within five years after the effective date of this amendment and implement load reduction plans within five years thereafter. The goal is to complete the load reductions within ten years of implementation plan approval.

Regional Water Board staff will work with the Native American Tribes in the Clear Lake watershed on mercury reduction programs for the tributaries and surface water runoff. Staff will solicit the Tribe's participation in the development of monitoring and implementation plans.

Wetlands

The Regional Water Board is concerned about the potential for wetland areas to be significant sources of methylmercury. Loads and fate of methylmercury from wetlands that drain to Clear Lake are not fully understood. The potential for production of methylmercury should be assessed during the planning of any wetlands or floodplain restoration projects within the Clear Lake watershed. The Regional Water

Board establishes a goal of no significant increases of methylmercury to Clear Lake resulting from such activities. As factors contributing to mercury methylation are better understood, the possible control of existing methylmercury production within tributary watersheds should be examined.

Atmospheric Deposition

Atmospheric loads of mercury originating outside of the Clear Lake watershed and depositing locally are minimal. Global and regional atmospheric inputs of mercury are not under the jurisdiction of the Regional Water Board. Loads of mercury from outside of the Clear Lake watershed and depositing from air onto the lake surface are established at the existing input rate, which is estimated to be 1 to 2 kg/year.

Public Education

An important component of the Clear Lake mercury strategy is public education. Until the effects of all mercury reduction efforts are reflected in fish tissue levels, the public needs to be continually informed about safe fish consumption levels. The Lake County Public Health Department will provide outreach and education to the community, emphasizing portions of the population that are at risk, such as pregnant women and children. Education efforts may include recommendations to eat smaller fish and species having lower mercury concentrations.

Monitoring and Review

The monitoring plan for Clear Lake will determine whether mercury loads have been reduced to meet sediment compliance goals and fish tissue objectives. Monitoring will include fish tissue, water and sediment sampling. The Regional Water Board will oversee the preparation of detailed monitoring plans and resources to conduct monitoring of sediment, water and fish to assess progress toward meeting the water quality objectives. Chapter V, Surveillance and Monitoring, provides details for monitoring in Clear Lake.

The Regional Water Board will review the progress toward meeting the fish tissue objectives for Clear Lake every five years. The review will be timed to coincide with the five-year review to be conducted by USEPA for the Record of Decision for the Sulphur Bank Mercury Mine Superfund Site. The Clear Lake mercury management strategy was developed with existing information. The Regional Water Board recognizes that there are uncertainties with the load estimates and the correlation between reductions in loads of total mercury, methylmercury uptake by biota, and fish tissue concentrations. Regional Water Board staff will consider any new data to refine load estimates and allocations from sources within the Clear Lake watershed. Estimates of existing loads

from SBMM or the tributaries will be refined during the review process. If new data indicate that the linkage analysis or load allocations will not result in attainment of the fish tissue objectives, or the fish tissue objectives or load allocations require adjustment, revisions to the Basin Plan will be proposed.

Pesticide Discharges from Nonpoint Sources

The control of pesticide discharges to surface waters from nonpoint sources will be achieved primarily by the development and implementation of management practices that minimize or eliminate the amount discharged. The Board will use water quality monitoring results to evaluate the effectiveness of control efforts and to help prioritize control efforts.

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review and control authority. The Board will work with water agencies and others whose activities may influence pesticide levels to minimize concentrations in surface waters.

Since the discharge of pesticides into surface waters will be allowed under certain conditions, the Board will take steps to ensure that this control program is conducted in compliance with the federal and state antidegradation policies. This will primarily be done as pesticide discharges are evaluated on a case by case basis.

Orchard Pesticide Runoff and Diazinon Runoff into the Sacramento and Feather Rivers

1. The orchard pesticide runoff and diazinon runoff control program shall:
 - a. ensure compliance with the diazinon water quality objectives in the Sacramento and Feather Rivers through the implementation of necessary management practices;
 - b. ensure that measures that are implemented to reduce diazinon discharges do not lead to an increase in the discharge of other pesticides to levels that violate applicable water quality objectives and Regional Water Board policies; and
 - c. ensure that pesticide discharges from orchards to surface waters are controlled so that the pesticide discharges are at the lowest level that is technically and economically achievable.
2. Orchard dischargers must consider whether a proposed alternative to diazinon has the potential to degrade ground or surface water. If the alternative to diazinon has the potential to degrade ground water, alternative pest control methods must be considered. If the alternative to diazinon has the potential to degrade surface water, control measures must be implemented to ensure that applicable water quality objectives and Regional Water Board policies are not violated.
3. Compliance with water quality objectives, waste load allocations, and load allocations for diazinon in the Sacramento and Feather Rivers is required by June 30, 2008.

The water quality objectives and allocations will be implemented through one or a combination of the following: the adoption of one or more waivers of waste discharge requirements, and general or individual waste discharge requirements. To the extent not already in place,

the Regional Water Board expects to adopt or revise the appropriate waiver(s) or waste discharge requirements by December 31, 2007.

4. The waste load allocations for all NPDES-permitted discharges are the diazinon water quality objectives.
5. The Regional Water Board will review the diazinon allocations and the implementation provisions in the Basin Plan at least once every five years, beginning no later than June 30, 2007.
6. Regional Water Board staff will meet at least annually with staff from the Department of Pesticide Regulation and representatives from the California Agricultural Commissioners and Sealers Association to review pesticide use and instream pesticide concentrations during the dormant spray application season and to consider the effectiveness of management measures in meeting water quality objectives.
7. The Loading Capacity (LC) for diazinon is determined by:

LC = C x Q x a Unit Conversion Factor; where C = the maximum concentration established by the diazinon water quality objectives and Q = the flow (the daily average flow is used in conjunction with the 0.080 mg/L diazinon objective and the four-day average flow is used in conjunction with the 0.050 mg/L diazinon objective). The LC will be calculated for the Sacramento River at I Street; the Sacramento River at Verona; the Sacramento River at Colusa; and the Feather River near its mouth. The value for Q (flow) in the Loading Capacity calculations for the Sacramento River sites will be increased to account for any flood control diversions into the Yolo Bypass or Butte Sink. The best available estimates of such diversions will be used.
8. The Load Allocation for discharges into the Sacramento River between Verona and I Street is determined by the following:

[LC(Sacramento River at I Street) minus LC(Sacramento River at Verona)] multiplied by 0.70.

The Load Allocations required to meet the Loading Capacity in the Sacramento River at Verona are determined by multiplying the LC calculated for the Sacramento River at Verona by the Load Allocation factors in Table IV-7. If the calculated Load Allocation for the Feather River

or Sacramento River at Colusa is greater than the Loading Capacity for that site, then the Loading Capacity for that site applies.

The Load Allocations establish the allowable diazinon load from nonpoint source dischargers.

Note: If the Sacramento River at Verona mean daily flow were 15,000 cubic feet per second or cfs, the loading capacity would equal approximately 2,900 grams/day for the 0.080 mg/L diazinon water quality objective. The Unit Conversion Factor would be 2.446.

The load allocations would be approximately 493 grams/day for the Colusa Basin Drain; 348 grams/day for the Feather River; 783 grams/day for the Sacramento River at Colusa; and 957 grams/day for Sutter/Butte.

If the mean daily flow in the Feather River were 5,000 cubic feet per second or cfs, the loading capacity would be approximately 978 grams/day for the 0.080 mg/L diazinon water quality objective. The Unit Conversion Factor would be 2.446.

If the load allocation for the Feather River for that day were 348 grams/day, the load allocation would apply.

9. The established waste load and load allocations for diazinon and the diazinon water quality objectives in the Sacramento and Feather Rivers represent a maximum allowable level. The Regional Water Board shall require any additional reductions in diazinon levels necessary to account for additive or synergistic toxicity effects or to protect beneficial uses in tributary waters.
10. Pursuant to CWC §13267, dischargers of diazinon must submit a management plan that describes the actions that the discharger will take to reduce diazinon discharges and meet the applicable allocations by the required compliance date.

The management plan may include actions required by State and federal pesticide regulations. The discharger must document the relationship between the actions to be taken and the expected reductions in diazinon discharge. Individual dischargers or a discharger group or coalition may submit management plans.

The management plan must comply with the provisions of any applicable waiver of waste discharge requirements or waste discharge requirements and must be submitted no later than June 30, 2005. The Regional Water Board may require revisions to the management plan if compliance with applicable allocations is not

attained or the management plan is not reasonably likely to attain compliance.

11. Any waiver of waste discharge requirements or waste discharge requirements that govern the control of orchard pesticide runoff or diazinon runoff that is discharged directly or indirectly into the Sacramento or Feather Rivers must be consistent with the policies and actions described in paragraphs 1-10.
12. In determining compliance with the waste load allocations, the Regional Water Board will consider any data or information submitted by the discharger regarding diazinon inputs from sources outside of the jurisdiction of the permitted discharge, including any diazinon present in precipitation; and any applicable provisions in the discharger's NPDES permit requiring the discharger to reduce the discharge of pollutants to the maximum extent practicable.

Location Descriptions

Colusa Basin Drain - is the Colusa Basin Drain at the confluence with the Sacramento River. The Colusa Basin Drain sub-watershed includes all land that drains into the Colusa Basin Drain.

Feather River - is the Feather River near the confluence with the Sacramento River. The Feather River sub-watershed includes all land that drains into the Feather River below the Oroville Dam, but does not include flow from the Sutter Bypass.

Sacramento River at Colusa - is the Sacramento River at the River Road bridge in the town of Colusa. (United States Geological Survey gauging Station 11389500) The Sacramento River at Colusa sub-watershed includes all land below Shasta Dam that drains to the Sacramento River at Colusa.

Sutter/Butte - is Sacramento Slough near the confluence with the Sacramento River or the sum of the Sutter Bypass near the confluence with the Feather River and Reclamation Slough near the confluence with the Sutter Bypass depending on flow conditions (minus diazinon loading resulting from Sacramento River water being bypassed into tributaries of Sacramento Slough or the Sutter Bypass). The Sutter/Butte sub-watershed includes all land that drains to Sacramento Slough, the Sutter Bypass, and Reclamation Slough.

Sacramento River at I Street - is the Sacramento River at the I Street Bridge in the city of Sacramento.

Sacramento River at Verona – is the Sacramento River at the United States Geological Survey gauging station at Verona (Station Number 11425500).

Table IV-7
Load Allocation Factors for Diazinon in the
Sacramento River Watershed

Sub-Watershed	Load Allocation Factor
Colusa Basin Drain	17%
Feather River	12%
Sacramento River at Colusa	27%
Sutter/Butte	33%

Dredging in the Sacramento River and San Joaquin River Basins

Large volumes of sediment are transported in the waters of the Sacramento and San Joaquin Rivers which drain the Central Valley. The average annual sediment load to San Francisco Bay from these two rivers is estimated to be 8 million cubic yards. Dredging and riverbank protection projects are ongoing, continuing activities necessary to keep ship channels open, prevent flooding, and control riverbank erosion. The Delta, with over 700 miles of waterways, is a major area of activity. At present, the Corps is overseeing the conduct and planning of rehabilitation work along 165 miles of levees surrounding 15 Delta islands. In addition, virtually all of the Delta levees have been upgraded by island owners or reclamation districts. The magnitude of recent operations, such as the Stockton and Sacramento Ship Channel Deepening Projects and Sacramento River Bank Protection Project, is discussed in recent U.S. Army Corps of Engineers Reports. For example, the Corps removes over 10 million cubic yards of sediment yearly from the Sacramento River. If the Sacramento River Deep Water Ship Channel is widened and deepened as proposed currently, 25 million cubic yards of bottom material will be removed from the river during the 5-year project.

Environmental impacts of dredging operations and materials disposal include temporary dissolved oxygen reduction, increased turbidity and, under certain conditions, the mobilization of toxic chemicals and release of biostimulatory substances from the sediments. The direct destruction and burial of spawning gravels and alteration of benthic habitat may be the most severe impacts. The existing regulatory process must be consistently implemented to assure protection of water quality and compliance

with the certification requirements of Section 401 of the Federal Clean Water Act.

The Regional Water Board continues to work with dredging interests in the San Francisco Bay and Delta to develop a long term management strategy (LTMS) for handling dredge spoils. We will adopt requirements for all significant dredging operations and upland disposal projects in the Region.

Nitrate Pollution of Ground Water in the Sacramento and San Joaquin River Basins

Since 1980, over 200 municipal supply wells have been closed in the Central Valley because of nitrate levels exceeding the State's 45 mg/l drinking water standard. Proposals have been submitted to assess the extent of the problem and explore possible regulatory responses, but without success. The increasing population growth in the Valley is expected to accelerate the problem's occurrence in the years ahead.

The Regional Water Board considers nitrate pollution to be a critical issue for beneficial use protection in the Central Valley Region. Staff will continue efforts to obtain study funds. Since nitrate pollution of ground water is not restricted to the Central Valley Region, the Regional Water Board recommends the State Water

Board take the lead in developing programs for controlling ground water contamination resulting from the use of nitrogen fertilizer on irrigated crops.

Temperature and Turbidity Increases Below Large Water Storage and Diversion Projects in the Sacramento River Basin

The storage and diversion of water for hydroelectric and other purposes can impact downstream beneficial uses because of changes in temperature and the introduction of turbidity. There are several large facilities in the Basin which have had a history of documented or suspected downstream impairments.

Where problems have been identified, the staff will work with operators to prepare management agency agreements or make recommendations to State Water Board regarding requirements to remedy the problems. Where problems are suspected, the staff will seek additional monitoring.

ESTIMATED COSTS OF AGRICULTURAL WATER QUALITY CONTROL PROGRAMS AND POTENTIAL SOURCES OF FINANCING

San Joaquin River Subsurface Agricultural Drainage Control Program

The estimates of capital and operational costs to achieve the selenium objective for the San Joaquin River range from \$3.6 million/year to \$27.4 million/year (1990 dollars). The cost of meeting water quality objectives in Mud Slough (north), Salt Slough, and the wetland supply channels is approximately \$2.7 million/year (1990 dollars).

Potential funding sources include:

1. Private financing by individual sources.
2. Bonded indebtedness or loans from governmental institutions.
3. Surcharge on water deliveries to lands contributing to the drainage problem.
4. Ad Valorem tax on lands contributing to the drainage problem.
5. Taxes and fees levied by a district created for the purpose of drainage management.
6. State or federal grants or low-interest loan programs.
7. Single-purpose appropriations from federal or State legislative bodies (including land retirement programs).

Pesticide Control Program

Based on an average of \$15 per acre per year for 500,000 acres of land planted to rice and an average of \$5 per acre per year for the remaining 3,500,000 acres of irrigated agriculture in the Sacramento and San Joaquin River Basins, the total annual cost to agriculture is estimated at \$25,000,000. Financial assistance for complying with this program may be obtainable through the U.S.D.A. Agricultural Stabilization and Conservation Service and technical assistance is available from the University of

California Cooperative Extension Service and the U.S.D.A. Soil Conservation Service.

Sacramento and Feather Rivers Orchard Runoff Control Program

The total estimated costs for management practices to meet the diazinon objectives for the Sacramento and Feather Rivers are from a \$0.3 million/ year cost savings to a \$3.8 million/year cost (2001 dollars). The estimated costs for discharger monitoring, planning, and evaluation are from \$0.5 to \$9.3 million/year (2003 dollars).

Potential funding sources include:

1. Those identified in the San Joaquin River Subsurface Agricultural Drainage Control Program and the Pesticide Control Program.

2. The Regional Board will inspect discharge flow monitoring facilities and will continue its cooperative effort with dischargers to ensure the quality of laboratory results.
3. The Regional Board will, on a regular basis, inspect any facilities constructed to store or treat agricultural subsurface drainage.
4. The Regional Board will continue to maintain and update its information on agricultural subsurface drainage facilities in the Grassland watershed. Efforts at collecting basic data on all facilities, including flow estimates and water quality will continue.
5. The Regional Water Board, in cooperation with other agencies, will regularly assess water conservation achievements, cost of such efforts and drainage reduction effectiveness information. In addition, in cooperation with the programs of other agencies and local district managers, the Regional Board will gather information on irrigation practices, i.e., irrigation efficiency, pre-irrigation efficiency, excessive deep percolation and on seepage losses.

Aerial Surveillance

Low-altitude flights are conducted primarily to observe variations in field conditions, gather photographic records of discharges, and document variations in water quality.

Self-Monitoring

Self-monitoring reports are normally submitted by the discharger on a monthly or quarterly basis as required by the permit conditions. They are routinely reviewed by Regional Water Board staff.

Compliance Monitoring

Compliance monitoring determines permit compliance, validates self-monitoring reports, and provides support for enforcement actions. Discharger compliance monitoring and enforcement actions are the responsibility of the Regional Water Board staff.

Complaint Investigation

Complaints from the public or governmental agencies regarding the discharge of pollutants or creation of nuisance conditions are investigated and pertinent information collected.

Clear Lake Methylmercury

The Regional Water Board will use the following criteria to determine compliance with the methylmercury fish tissue objectives in Clear Lake. Mercury will be measured in fish of the species and sizes consumed by humans and wildlife. The objectives are based on the average of methylmercury concentrations in muscle tissue of trophic level 3 and 4 fish. Because greater than 85% of total mercury in muscle tissue of fish of these sizes is methylmercury, analysis of muscle tissue for total mercury is acceptable for assessing compliance.

Fish from the following species will be collected and analyzed every ten years. The representative fish species for trophic level 4 shall be largemouth bass (total length 300-400 mm), catfish (total length 300 – 400 mm), brown bullhead (total length 300-400 mm), and crappie (total length 200-300 mm). The representative fish species for trophic level 3 shall be carp, hitch, Sacramento blackfish, black bullhead, and bluegill of all sizes; and brown bullhead and catfish of lengths less than the trophic level 4 lengths.

Fish tissue mercury concentrations are not expected to respond quickly to remediation activities at Sulphur Bank Mercury Mine, Clear Lake sediments, or the tributaries. Adult fish integrate methylmercury over a lifetime and load reduction efforts are not expected to be discernable for more than five years after remediation efforts. Therefore to assess remedial activities, part of the monitoring at Clear Lake will include indicator species, consisting of inland silversides and largemouth bass less than one year old, to be sampled every five years. Juveniles of these species will reflect recent exposure to methylmercury and can be indicators of mercury reduction efforts.

Average concentrations of methylmercury by trophic level should be determined in a combination of the identified species collected throughout Clear Lake. The number of fish collected to determine compliance with this objective will be based on the statistical variance within each species. The sample size will be determined by methods described in USEPA's Guidance for Assessing Chemical Contaminant Data for Use in Fish or other statistical methods approved by the Executive Officer.

Total mercury in tributary sediment, lake sediment, and water will be monitored to determine whether loads have decreased. The water and sediment monitoring frequency will be every five years.

Orchard Pesticide Runoff and Diazinon Runoff into the Sacramento and Feather Rivers

The Regional Water Board requires a focused monitoring effort of pesticide runoff from orchards in the Sacramento Valley.

The monitoring and reporting program for any waste discharge requirements or waiver of waste discharge requirements that addresses pesticide runoff from orchards in the Sacramento Valley must be designed to collect the information necessary to:

1. determine compliance with established water quality objectives for diazinon in the Sacramento and Feather Rivers ;
2. determine compliance with established waste load allocations and load allocations for diazinon;
3. determine the degree of implementation of management practices to reduce off-site migration of diazinon;
4. determine the effectiveness of management practices and strategies to reduce off-site migration of diazinon;
5. determine whether alternatives to diazinon are causing surface water quality impacts;
6. determine whether the discharge causes or contributes to a toxicity impairment due to additive or synergistic effects of multiple pollutants; and
7. demonstrate that management practices are achieving the lowest pesticide levels technically and economically achievable.

Dischargers are responsible for providing the necessary information. The information may come from the dischargers' monitoring efforts; monitoring programs conducted by State or federal agencies or collaborative watershed efforts; or from special studies that evaluate the effectiveness of management practices.

APPENDIX DIRECTORY (continued)

<u>ITEM*</u>	<u>DESCRIPTION</u>
34.	Regional Water Board Guidelines for Erosion
35.	Regional Water Board Guidelines for Small Hydroelectric Facilities
36.	Regional Water Board Guidelines for Disposal from Land Developments
37.	Regional Water Board Guidelines for Mining
38.	Regional Water Board list of Water Quality Limited Segments - - - Removed 6 September 2002
39.	Federal Anti-degradation policy (40 CFR 131.12)
40.	Grassland Watershed Wetland Channels

* Appendix items are paginated by: item number/item page/item total pages